

I-95 Traffic Operations and Traffic Management On-Call Technical Memorandum

Calibrate and Implement Signal Timing

June 28, 2007

Prepared for South Central Regional Council of Governments

Prepared by Urbitran Associates, Inc.

In Association with Clough Harbour & Associates, LLP Dunn Engineering Associates, P.C.

Overview

Traffic signal timing plans were developed for 39 intersections that were identified by SCRCOG, the City of New Haven and the Consultant as listed in Table 1 and shown in Figure 1. Four timing plans were developed for 35 of the intersections. A single emergency timing plan was developed for four of the intersections. The timing plans for 21 of the intersections were input to the central traffic control computer located in the City of New Haven, and observed and monitored in the field.

Network Development and Calibration

The SYNCHRO traffic simulation network for the study area was developed and calibrated using traffic and roadway data from an earlier (Phase 1) study supplemented by additional data provided by SCRCOG and the City of New Haven. In addition, field observations were conducted during the study to observe queuing, conflicts, signal timing operations and other pertinent traffic operational conditions, and were used to help refine the calibrated network for existing conditions.

Six sub-area networks were developed: Three were implemented, and three are to be implemented at a later date.

- **Ikea Area:** This sub-area includes six signalized intersections controlled by the Naztec type signal controller. Four timing plans were developed. Two of the plans weekday AM peak, and weekday PM peak / Saturday-Sunday midday were successfully implemented and monitored on June 28th, 2007. The other two plans are for the same time periods for the future condition when diversion due to I-95 reconstruction is projected to occur. These plans were entered and stored into the system. In addition, at one location (the intersection at Ikea driveway), a fifth plan was implemented and monitored for Saturday-Sunday midday. Existing and proposed plans are presented in Tables 2A and 2B, respectively.
- **Grand Avenue:** This sub-area includes four signalized intersections controlled by the Naztec type signal controller. One timing plan was developed for emergency situations when incidents on southbound I-91 are projected to cause traffic to be diverted to this corridor. The plan was entered and stored into the system. It was tested and adjusted during the midday period on June 27th, 2007. Existing and proposed plans are presented in Tables 3A and 3B, respectively.
- Lower State Street and Water Street. This sub-area includes eleven signalized intersections controlled by the Transcore type signal controller. Four timing plans were developed. Two of the plans weekday AM peak and weekday PM peak were entered and stored into the system. They were partially tested, but infrastucture issues with the City's central computer system prevented the plans from running live for more than a few hours. These two plans will be monitored when infrastucture issues are cleared up, expected to occur during the first or second week in July, 2007. The other two plans are for the same time periods for the future condition when diversion

- due to I-95 reconstruction is projected to occur. These plans were entered and stored into the system. Existing and proposed plans are presented in Tables 4A and 4B, respectively.
- Upper State Street and Middletown Avenue. This sub-area includes nine intersections. Four plans were developed for the future condition weekday AM peak, weekday PM peak, daily midday, and all other times. These plans will be implemented when new signal hardware comes online, projected to occur about 2009. It was assumed that the future hardware would include signal equipment not currently present, such as controllers capable of coordinated operation, loop detectors and pedestrian signals, per Design Report for Zone 5d, Computerized Signal System Phase 3, issued by Wilbur Smith Associates in November, 1999. Existing and proposed plans are presented in Tables 5A and 5B, respectively.
- **Forbes Avenue.** This sub-area includes five signalized intersections. Four of the signals are currently under ConnDOT's jurisdiction. One is an isolated intersection under the jurisdiction of the city of New Haven. Four timing plans were developed for the future condition weekday AM peak, weekday PM peak, weekday midday, and all other times. Existing and proposed plans are presented in Tables 6A and 6B, respectively.
- **Middletown Avenue and Foxon Boulevard.** This sub-area includes four intersections. Signal control is currently under ConnDOT's juridiction. Four plans were developed for the future condition weekday AM peak, weekday PM peak, daily midday, and all other times. Existing and proposed plans are presented in Tables 7A and 7B, respectively.

Figures 2 through 7 show the SYNCHRO traffic networks for the four sub-areas.

TABLE 1
SUMMARY OF STUDY INTERSECTIONS

No.	Corridor	Major Street	Minor Street	Jurisdiction	System	Contoller Type	Deliverable	No. of Timing Plans	Studied during Phase 1?
1	Ikea	Sargent Dr	Brewery St	New Haven	Naztec	Naztec 2070 TS-0	Implement and Monitor	3	No
2	Ikea	Long Wharf Dr	Canal Dock Rd	New Haven	Naztec	Naztec 2070 TS-1	Implement and Monitor	4	No
3	Ikea	Sargent Dr	Canal Dock Rd	New Haven	Naztec	Naztec 2070 TS-1	Implement and Monitor	4	No
4	Ikea	Sargent Dr	I-95 SB Off Ramp Exit 46	New Haven	Naztec	Naztec 2070 TS-1	Implement and Monitor	4	No
5	Ikea	Sargent Dr	Church St Extension	New Haven	Naztec	Naztec 2070 TS-1	Implement and Monitor	4	No
6	Ikea	Sargent Dr	I-95 SB On Ramp Exit 46	New Haven	Naztec	Naztec 2070 TS-1	Implement and Monitor	4	No
7	Grand Ave	E Grand Ave	Quinnipiac Ave	New Haven	Naztec	Naztec 2070 TS-1	Implement	1 (Emergency)	Yes
8	Grand Ave	Grand Ave	Front St	New Haven	Naztec	Naztec 2070 TS-1	Implement	1 (Emergency)	Yes
9	Grand Ave	Grand Ave	Clinton Ave	New Haven	Naztec	Naztec 2070 TS-1	Implement	1 (Emergency)	No
10	Grand Ave	Grand Ave	Ferry St	New Haven	Naztec	Naztec 2070 TS-1	Implement	1 (Emergency)	Yes
11	US1	Water St	Chestnut St	New Haven	Transcore	Naztec, TCT TS-1	Implement and Monitor	4	No
12	US1	Water St	Brewery St	New Haven	Transcore	Naztec, TCT TS-1	Implement and Monitor	4	Yes
13	US1	Water St	Olive St	New Haven	Transcore	Naztec, TCT TS-1	Implement and Monitor	4	Yes
14	US1	State St	Water St	New Haven	Transcore	Naztec, TCT TS-1	Implement and Monitor	4	Yes
15	Lower State St	NB State St	Fair St	New Haven	Transcore	Naztec, TCT TS-1	Implement and Monitor	4	Yes
16	Lower State St	SB State St	George St/Fair St	New Haven	Transcore	Naztec, TCT TS-1	Implement and Monitor	4	Yes
17	Lower State St	State St	Chapel St	New Haven	Transcore	Naztec, TCT TS-1	Implement and Monitor	4	Yes
18	Lower State St	State St	Court St	New Haven	Transcore	Naztec, TCT TS-1	Implement and Monitor	4	No
19	Lower State St	State St	Elm St/Grand Ave	New Haven	Transcore	Naztec, TCT TS-1	Implement and Monitor	4	Yes
20	Lower State St	State St	Grove St/Olive St	New Haven	Transcore	Naztec, TCT TS-1	Implement and Monitor	4	Yes
21	Lower State St	State St	Audubon St	New Haven	Transcore	Naztec, TCT TS-1	Implement and Monitor	4	Yes
22	Upper State St	State St	Humphery St	New Haven	Isolated	NA	Timing Only	4	Yes
23	Upper State St	State St	Edwards St	New Haven	Isolated	NA	Timing Only	4	Yes
24	Upper State St	State St	East St/Mechanic St	New Haven	Isolated	NA	Timing Only	4	Yes
25	Upper State St	State St	I-91 NB Off Ramp Exit 5/James St	New Haven	Isolated	NA	Timing Only	4	Yes
26	Upper State St	State St	Blatchley Ave/Willow St	New Haven	Isolated	NA	Timing Only	4	Yes
27	Upper State St	State St	Ferry St/May St	New Haven	Isolated	NA	Timing Only	4	Yes
28	Upper State St	Middletown Ave	Ferry St	New Haven	Isolated	NA	Timing Only	4	Yes
29	Upper State St	Middletown Ave	I-91 SB Off Ramp Exit 7	New Haven	Isolated	NA	Timing Only	4	No
30	Upper State St	Middletown Ave	Clinton Ave	New Haven	Isolated	NA	Timing Only	4	No
31	US1	Forbes Ave	Townsend Ave	ConnDOT	NA	NA	Timing Only	4	Yes
32	US1	Forbes Ave	Woodward Ave	ConnDOT	NA	NA	Timing Only	4	Yes
33	US1	Forbes Ave	Fulton St	ConnDOT	NA	NA	Timing Only	4	No
34	US1	Forbes Ave	Stiles StWheeler St	ConnDOT	NA	NA	Timing Only	4	No
35	US1	Water St	East St	New Haven	Isolated	NA	Timing Only	4	Yes
36	Middletown/Foxon	Middletown Ave	I-91 SB Ramp Exit 8	ConnDOT	NA	NA	Timing Only	1 (Emergency)	Yes
37	Middletown/Foxon	Middletown Ave	Foxon Blvd/I-91 NB Off Ramp Exit 8	ConnDOT	NA	NA	Timing Only	1 (Emergency)	Yes
38	Middletown/Foxon	Foxon Blvd	Shopping Center	ConnDOT	NA	NA	Timing Only	1 (Emergency)	No
39	Middletown/Foxon	Foxon Blvd	Quinnipiac Ave	ConnDOT	NA	NA	Timing Only	1 (Emergency)	Yes

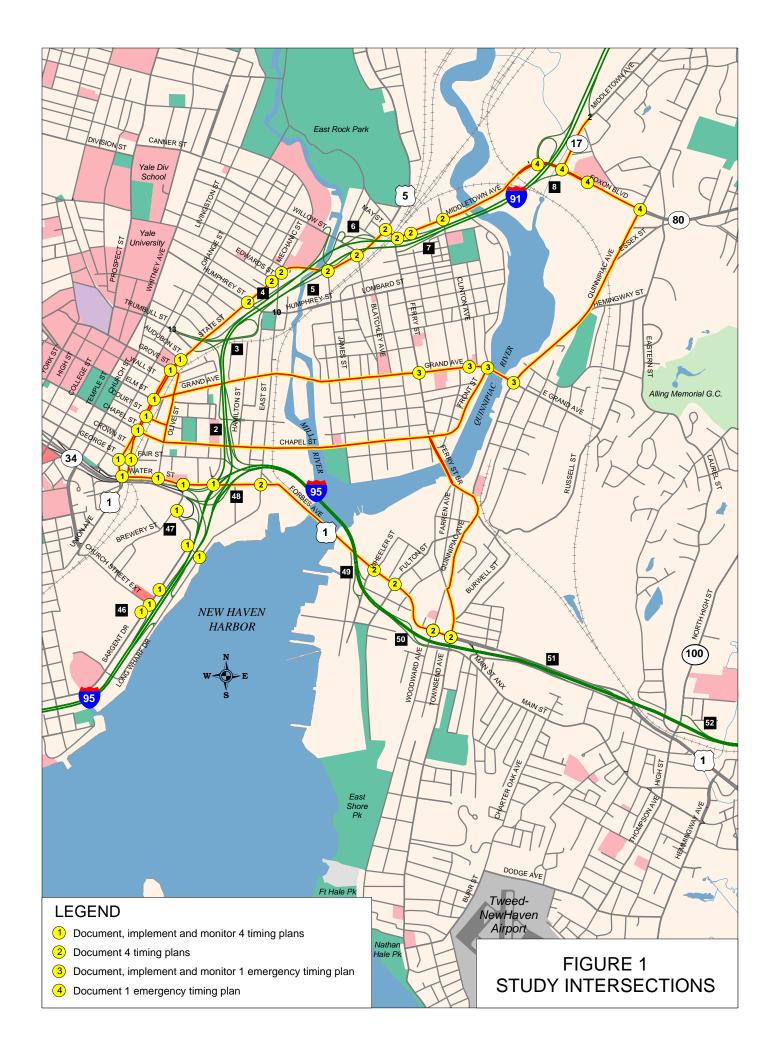


TABLE 2A
IKEA AREA (NAZTEC SIGNALS)
EXISTING TIMING

MAIN ST	CROSS ST	SPLIT TABLE NO.	TIME	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8	CYCLE	OFFSET
Long Wharf Dr	Canal Dock Rd	Split 1	0600-0900 M-F 1100-1700 S-S	11	28	22	19	0	0	0	0	80	31
		Split 3	1500-1900 M-F	11	32	22	25	0	0	0	0	90	52
Sargent Dr	Canal Dock Rd	Split 1	0600-0900 M-F 1100-1700 S-S	8	15	22	0	8	15	16	19	80	1
		Split 3	1500-1900 M-F	8	24	22	0	8	24	19	17	90	1
Sargent Dr	I-95 SB Off	Split 1	0600-0900 M-F 1100-1700 S-S	0	27	28	20	0	0	0	0	85	31
		Split 3	1500-1900 M-F	0	47	28	15	0	0	0	0	90	78
Sargent Dr	Church St Ext/ I-95 SB On-Ramp	Split 1	0600-0900 M-F 1100-1700 S-S	0	25	24	10	9	12	0	0	80	63
	1-95 SB OII-Nailip	Split 3	1500-1900 M-F	0	19	24	22	9	16	0	0	90	42
Sargent Dr	Brewery St	Split 1	0600-0900 M-F 1100-1700 S-S	0	24	23	20	13	0	0	0	80	49
		Split 3	1500-1900 M-F	0	34	23	19	14	0	0	0	90	54

TABLE 2B
IKEA AREA (NAZTEC SIGNALS)
PROPOSED TIMING

MAIN ST	CROSS ST	SPLIT TABLE NO.	TIME	Phas 1	Phas 2	Phas 3	Phas 4	Phas 5	Phas 6	Phas 7	Phas 8	CYCLE	OFFSET
		Split 5	Present 0600-0900 M-F	17	27	22	14	0	0	0	0	80	53
Long Wharf Dr	Canal Dock Rd	Split 6	Present 1500-1900 M-F Present 1100-1700 S-S	16	33	22	19	0	0	0	0	90	56
Long Whan Di	Carlai Duck Nu	Split 7	Future 0600-0900 M-F	21	34	22	13	0	0	0	0	90	10
		Split 8	Future 1500-1900 M-F Future 1100-1700 S-S	11	44	22	13	0	0	0	0	90	44
		Split 5	Present 0600-0900 M-F	8	22	22	0	8	22	13	15	80	9
Sargent Dr	Canal Dock Rd /	Split 6	Present 1500-1900 M-F Present 1100-1700 S-S	10	34	22	0	10	34	9	15	90	45
Jaigent Di	Ikea Driveway	Split 7	Future 0600-0900 M-F	8	25	22	0	8	25	20	15	90	45
		Split 8	Future 1500-1900 M-F	9	32	22	0	9	32	12	15	90	63
		Split 9	Pres & Fut 1100-1700 S-S	9	25	22	0	9	25	9	25	90	36
		Split 5	Present 0600-0900 M-F	0	30	34	16	0	0	0	0	80	51
Connect Dr	1 OF OD O#	Split 6	Present 1500-1900 M-F Present 1100-1700 S-S	0	36	37	17	0	0	0	0	90	3
Sargent Dr	I-95 SB Off	Split 7	Future 0600-0900 M-F	0	36	38	16	0	0	0	0	90	4
		Split 8	Future 1500-1900 M-F Future 1100-1700 S-S	0	40	34	16	0	0	0	0	90	21
		Split 5	Present 0600-0900 M-F	0	28	24	9	9	10	0	0	80	63
Sargent Dr	Church St Ext/	Split 6	Present 1500-1900 M-F Present 1100-1700 S-S	0	26	24	0	14	17	0	0	90	42
Sargeni	I-95 SB On-Ramp	Split 7	Future 0600-0900 M-F	0	37	24	9	9	11	0	0	90	24
		Split 8	Future 1500-1900 M-F Future 1100-1700 S-S	0	31	24	9	12	14	0	0	90	59
		Split 5	Present 0600-0900 M-F	0	23	23	19	15	0	0	0	80	41
Sargent Dr	Brewery St	Split 6	Present 1500-1900 M-F Present 1100-1700 S-S	0	30	23	22	15	0	0	0	90	89
Salgelli Di	Diewery St	Split 7	Future 0600-0900 M-F	0	28	23	21	18	0	0	0	90	1
		Split 8	Future 1500-1900 M-F Future 1100-1700 S-S	0	31	23	21	15	0	0	0	90	16

TABLE 3A
GRAND AVENUE (NAZTEC SIGNALS)
EXISTING TIMING

MAIN ST	CROSS ST	SPLIT TABLE NO.	TIME	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8	CYCLE	OFFSET
Grand Ave	Quinnipiac Ave	Split 1	0600-0900 M-F	0	23	18	20	0	0	0	29	90	22
Gianu Ave	Quilliplac Ave	Split 3	1500-1900 M-F	0	32	18	20	0	0	0	20	90	42
Grand Ave	Front St	Split 1	0600-0900 M-F	0	44	18	28	0	0	0	0	90	22
Gianu Ave	FIORE SE	Split 3	1500-1900 M-F	0	36	18	36	0	0	0	0	90	89
Grand Ave	Clinton Ave	Split 1	0600-0900 M-F	0	48	16	26	0	0	0	26	90	26
Gianu Ave	Clinton Ave	Split 3	1500-1900 M-F	0	46	16	28	0	0	0	28	90	8
Grand Ave	Ferry St	Split 1	0600-0900 M-F	12	29	11	25	13	0	11	25	90	43
Gland Ave	Telly St	Split 3	1500-1900 M-F	11	26	10	28	15	0	10	28	90	27

TABLE 3B
GRAND AVENUE (NAZTEC SIGNALS)
PROPOSED TIMING

MAIN ST	CROSS ST	SPLIT TABLE NO.	TIME	Phas 1	Phas 2	Phas 3	Phas 4	Phas 5	Phas 6	Phas 7	Phas 8	CYCLE	OFFSET
Grand Ave	Quinnipiac Ave	Split 10	Emergency	0	37	18	10	0	0	0	55	120	28
Grand Ave	Front St	Split 10	Emergency	0	58	18	44	0	0	0	0	120	26
Grand Ave	Clinton Ave	Split 10	Emergency	0	75	16	29	0	0	0	26	120	38
Grand Ave	Ferry St	Split 10	Emergency	10	57	10	27	16	0	11	26	120	54

TABLE 4A
LOWER STATE ST AND WATER ST (TRANSCORE SIGNALS)
EXISTING TIMING

Water St
Water St Chestnut St Fixed Fixed Actuated Fixed
Plan 1 AM Peak Split 39 29 68 act NA different than given on timing state
Water St
Water St
Water St
Water St
Plan 3 PM Peak Split 10 30 27 67 16 different than given on timing some state of the plan 3 PM Peak Split 10 30 27 67 16 different than given on timing some state of the plan 3 PM Peak Split 28 22 50 35 Phase 1. Observed cycle and year different than last year.
Water St Olive St Type Fixed Fixed Fixed Fixed Offset reference to beginning of Plan 1 AM Peak Split 28 22 So So Offset reference to beginning of Plan 3 PM Peak Split 29 21 So O Offset reference to beginning of Plan 3 PM Peak Split 29 21 So O Offset reference to beginning of Plan 3 PM Peak Split 29 21 So O Offset reference to beginning of Plan 1 AM Peak Split 29 21 So O Offset reference to beginning of Plan 1 AM Peak Split 15 27 23 25 22 25 23 20 Offset reference to beginning of Plan 3 PM Peak Split 20 29 23 18 28 26 23 13 Offset reference to beginning of Plan 1 AM Peak Split 20 29 23 18 28 26 23 13 Offset reference to beginning of Plan 1 AM Peak Split 20 29 23 18 28 26 23 13 Offset reference to beginning of Plan 1 AM Peak Split 20 29 23 18 28 26 23 13 Offset reference to beginning of Plan 1 AM Peak Split 30 44 16 Offset reference to beginning of Plan 1 AM Peak Split 30 44 16 Offset reference to beginning of Plan 1 AM Peak Split 30 44 16 Offset reference to beginning of Plan 1 AM Peak Split 30 44 16 Offset reference to beginning of Plan 1 AM Peak Split 30 44 16 Offset reference to beginning of Plan 1 AM Peak Split 30 44 16 Offset reference to beginning of Plan 1 AM Peak Split 30 44 16 Offset reference to beginning of Plan 1 AM Peak Split 30 Offset reference to beginning of Plan 1 AM Peak Split 30 Offset reference to beginning of Plan 1 AM Peak Split Offset reference to beginning of Plan 1 AM Peak Split Offset reference to beginning of Plan 1 AM Peak Split Offset reference to beginning of Plan 1 AM Peak Split Offset reference to beginning of Plan 1 AM Peak Split Offset reference to beginning of Plan 1 AM Peak Split Offset reference to Deciding Plan 1 AM Peak Split Offset reference to Deciding Plan 1 AM Peak Split Offset reference to Deciding Plan 1 AM Peak Split Offset reference
Water St Olive St Type Fixed Fixed Fixed Fixed State St State St State St State St Fair St Fair St Fair St Fair St Fair St Plan 3 PM Peak Split 30 44 16 Plan 3 PM Peak Split 30 At 4 16 Plan 3 PM Peak Split 30 At 4 16 Plan 3 PM Peak Split 30 At 4 16 Plan 3 PM Peak Split 30 At 4 Fixed Plan 4 Pm Peak Split 30 At 4 16 Plan 3 PM Peak Split 30 At 4 16 Plan 3 P
Plan 1 AM Peak Split 28 22 25 35 25 27 25 25 25 27 25 27 27
State St
State St Water St Water St Water St Type Actuated Coord Ped Button Actuated Actuated Coord Coord Ped Button Actuated Actuated Coord Ped Button Actuated Actuated Coord Ped Button Actuated Coord Ped Button Offset reference to be yellow Phases 2 and 6. Unuse time goes to next phase.
State St
State St
Plan 3 PM Peak Split 20 29 23 18 28 26 23 13 90 80 time goes to next phase.
SB State St
SB State St George St/ Fair St Type Coord Fixed Ped Button with ped button. Offset reference beginning of yellow Phase 1. Upon 3 minutes and ped time goes to coordinated ped time go
Fair St
Movement NB EB No detection. Pre-timed opera
Type Fixed Fixed No detection. Pre-timed opera
NB State St. L. Fair St. L. Fair St. L. T.
Plan 1 AM Peak Split 20 25 4 Phase 1.
Plan 3 PM Peak Split 20 25 45 1
Movement NB-L SB Ped EB/WB SB-L NB Dummy Dummy Detection at major street left to
Type Actuated Coordinated Ped Button Fixed Actuated Coordinated Co
State St Chapel St Chapel St Type Notable Very State St Notable Very State St Violated Very State St Offset reference to beginning or Phase 2. Unused ped time good ped time good state Stat
Plan 3 PM Peak Split 15 25 25 15 25 25 25 90 20 phase.
Movement NB/SB EB/WB Ped Detection at minor street. Coo
Type Coordinated Actuated Ped Button operation with ped button. Off
State St Court St Minimum Split 12 12 25 reference to beginning of yello
Plan 1 AM Peak Split 45 20 25 90 15 2. Unused ped time goes to co
Plan 3 PM Peak Split 45 20 25 90 15 phase.
Movement NB/SB EB Ped No detection. Coordinated ope
Type Fixed Fixed Ped Button with ped button Offset referen
State St Elm St Plan 1 AM Peak Split 31 40 19 90 20 beginning of yellow Phase 2. U
Plan 3 PM Peak Split 35 36 19 90 16 ped time goes to next phase.
Movement SB NB-L Ped EB/WB NB SB-L EB-WB No detection. Ped time added
Grove St/Olive Type Fixed Fixed Ped Button Fixed
State St St Plan 1 AM Peak Split 32 16 21 21 30 15 21 69; 90 w/ped NA sequence different than given
Plan 3 PM Peak Split 32 16 21 21 30 15 21 69; 90 w/ped NA sheets.
Movement NB/SB EB/WB
No detection. Pre-timed opera Type Fixed F
State St Audubon St Plan 1 AM Peak Split 70 20 Offset reference to beginning a Phase 2.
Plan 3 PM Peak Split 70 20 90 25

TABLE 4B PAGE 1 OF 2

LOWER STATE ST AND WATER ST (TRANSCORE SIGNALS) PROPOSED TIMING

MAIN ST	CROSS ST	CATEGORY	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8	CYCLE	OFFSET	COMMENTS
		Movement		EB/WB		SB							
		Туре		Coordinated		Fixed							Detection at minor movement.
\\/-+ O+	Ob t t Ot	Plan 5 AM Peak Split		33		27					60	7	Actuated/coordinated operation. Offset
Water St	Chestnut St	Plan 6 PM Peak Split		33		27					60	18	reference to beginning of yellow Phase
		Plan 7 AM Peak Split Future		45		30					75	10	2.
		Plan 8 PM Peak Split Future		45		30					75	3	
		Movement	WB	EB/WB		NB							
		Type	Fixed	Fixed		Fixed							l
\\/-+ O+	D 04	Plan 5 AM Peak Split	11	32		17					60	12	No detection. Pre-timed operation. Offset
Water St	Brewery St	Plan 6 PM Peak Split	19	25		16					60	34	reference to beginning of yellow Phase
		Plan 7 AM Peak Split Future	19	37		19					75	12	2.
		Plan 8 PM Peak Split Future	23	31		21					75	30	
		Movement	EB/WB	SB									
	; -	Туре	Fixed	Fixed									
	011 01	Plan 5 AM Peak Split	36	24							60	35	No detection. Pre-timed operation. Offset
Water St	Olive St	Plan 6 PM Peak Split	32	28							60	22	reference to beginning of yellow Phase
	; -	Plan 7 AM Peak Split Future	46	29							75	31	1.
		Plan 8 PM Peak Split Future	42	33							75	22	
		Movement	NB-L/EB-R	SB	Ped	EB-R/WB	SB-L	NB	Dummy	Dummy			
		Type	Actuated	Coord	Ped Button	Actuated	Actuated	Coord					Detection at all minor movements.
0 0.		Plan 5 AM Peak Split	15	25	23	27	15	25	23	27	90	42	Actuated/coordinated operation with ped
State St	Water St	Plan 6 PM Peak Split	16	32	23	19	16	32	23	19	90	35	button. Offset reference to beginning of yellow Phases 2 and 6. Unused ped time
		Plan 7 AM Peak Split Future	15	25	23	27	13	27	23	27	90	42	goes to next phase.
		Plan 8 PM Peak Split Future	16	36	23	15	20	32	23	15	90	39	good to noxt pridoc.
		Movement	NB	EB	Ped								
		Type	Coord	Fixed	Ped Button								No detection. Coordinated operation with
00.01.01	George St/	Plan 5 AM Peak Split	43	31	16						90	33	ped button. Offset reference to beginning
SB State St	Fair St	Plan 6 PM Peak Split	40	34	16						90	31	of yellow Phase 1. Unused ped time
		Plan 7 AM Peak Split Future	43	31	16						90	33	goes to coordinated phase.
		Plan 8 PM Peak Split Future	40	34	16						90	31	
		Movement	SB	EB									
		Туре	Fixed	Fixed									
ND Ct-t- Ct	F-i- 04	Plan 5 AM Peak Split	38	52							90	39	No detection. Pre-timed operation. Offset
NB State St	Fair St	Plan 6 PM Peak Split	35	55							90	37	reference to beginning of yellow Phase
		Plan 7 AM Peak Split Future	38	52							90	39	["
		Plan 8 PM Peak Split Future	35	55							90	37	
		Movement	NB-L	SB	Ped	EB/WB	SB-L	NB	Dummy	Dummy			
		Type	Actuated	Coordinated	Ped Button	Fixed	Actuated	Coordinated					Detection at major street left turns.
0 0.	01 101	Plan 5 AM Peak Split	14	21	25	30	14	21	25	30	90	14	Coordinated operation with ped button.
State St	Chapel St	Plan 6 PM Peak Split	13	22	25	30	13	22	25	30	90	13	Offset reference to beginning of yellow Phase 2. Unused ped time goes to next
		Plan 7 AM Peak Split Future	14	19	25	32	14	19	25	32	90	14	phase.
		Plan 8 PM Peak Split Future	13	24	25	28	16	24	25	28	90	16	

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TRANSCORE SIGNALS - LOWER STATE ST AND WATER ST PROPOSED TIMING

MAIN ST	CROSS ST	CATEGORY	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8	CYCLE	OFFSET	COMMENTS
		Movement		NB/SB	EB/WB	Ped							
		Type		Coordinated	Actuated	Ped Button							Detection at minor street. Coordinated
State St	Court St	Plan 5 AM Peak Split		43	22	25					90	1()	operation with ped button. Offset reference to beginning of yellow Phase
State St	Court St	Plan 6 PM Peak Split		40	25	25					90		Unused ped time goes to coordinated
		Plan 7 AM Peak Split Future		43	22	25					90		phase.
		Plan 8 PM Peak Split Future		40	25	25					90	9	
		Movement	NB/SB	EB	Ped								
		Туре	Fixed	Coordinated	Ped Button								No detection. Coordinated operation with
State St	Elm St	Plan 5 AM Peak Split	28	43	19						90		ped button. Offset reference to beginning
State St	Liiii St	Plan 6 PM Peak Split	28	43	19						90		of yellow Phase 2. Unused ped time
		Plan 7 AM Peak Split Future	26	45	19						90	23	goes to next phase.
		Plan 8 PM Peak Split Future	28	43	19						90	25	
		Movement	SB	NB-L	Ped	EB/WB	NB	SB-L		EB-WB			
		Type	Fixed	Coordinated	Ped Button	Fixed	Fixed	Fixed		Fixed			No detection. Coordinated operation
State St	Grove St/Olive	Plan 5 AM Peak Split	27	18	21	24	27	18		24	90	43	with ped button. Offset reference to
State St	St	Plan 6 PM Peak Split	27	18	21	24	27	18		24	90		beginning of yellow Phase 2. Unused
		Plan 7 AM Peak Split Future	27	18	21	24	27	18		24	90	43	ped time goes to coordinated phase.
		Plan 8 PM Peak Split Future	27	18	21	24	27	18		24	90	5	
		Movement		NB/SB	EB/WB								
		Type		Fixed	Fixed								No detection Drestined and " O"
State St	Audubon St	Plan 5 AM Peak Split		72	18						90	80	No detection. Pre-timed operation. Offse reference to beginning of yellow Phase
State St	Audubon St	Plan 6 PM Peak Split		72	18						90	37	2
		Plan 7 AM Peak Split Future		72	18						90	80	- -
		Plan 8 PM Peak Split Future		72	18						90	37	

TABLE 5A UPPER STATE ST AND MIDDLETOWN AVE EXISTING TIMING

MAIN ST	CROSS ST	CATEGORY	Phase 1	Phase 2	Phase 3	Phase 4	CYCLE	OFFSET	COMMENTS
		Movement	State NB/SB	Ped	Humphrey WB	Humphrey EB/WB			No detection Dedition added to sold
State St	Humphrey St	Туре	Fixed	Ped Button	Fixed	Fixed			No detection. Ped time added to cycle. No coordination.
		Split (All Times)	35	18	16	29	80 w/o ped; 98 w/ped	NA	140 Coordination.
		Movement	State NB/SB	Ped	Edwards EB & State SB-R				Detection at minor movement. Semi
State St	Edwards St	Туре	Fixed	Ped Button	Actuated				actuated. Ped time added to cycle. No
		Split (All Times)	45	21	30 Max		NA	NA	corodination.
	East St /	Movement	State EB/WB	Ped	East NB/SB				No detection. Ded time added to evale
State St	Mechanic St	Туре	Fixed	Ped Button	Fixed				No detection. Ped time added to cycle. No coordination.
	Wiccharlic Ot	Split (All Times)	45	20	35		80 w/o ped; 100 w/ped	NA	140 coordination.
	James St /	Movement	State EB/WB	James NB / Driveway SB	Ramp EB				Detection of ND 9 CD managements Commit
State St	I-91 Exit 5 NB	Туре	Fixed	Actuated	Fixed				Detection at NB & SB movements. Semi actuated. No corodination.
	Off Ramp	Split (All Times)	22	11	22		NA	NA	actuated. No corodination.
	DI	Movement	State EB/WB	Ped	Blatchley/Willow NB/SB				N 1
State St	Blatchley Ave / Willow St	Туре	Fixed	Ped Button	Fixed				No detection. Ped time added to cycle. No coordination.
	Willow St	Split (All Times)	45	20	35		80 w/o ped; 100 w/ped	NA	140 Coordination.
	Farm Ct / Marc	Movement	State EB/WB	State WB/Ferry NB-R	Ferry NB	Ped			No detection Dedition added to soul
State St	Ferry St / May St	Туре	Fixed	Fixed	Fixed	Ped Button			No detection. Ped time added to cycle. No coordination.
	Oi.	Split (All Times)	35	15	30	19	80 w/o ped; 99 w/ped	NA	140 coordination.
Mistallatarras		Movement	Middletown WB/Ferry NB-R	Ferry NB/SB-R	Ferry SB/Middletown WB-R				
Middletown Ave	Ferry St	Туре	Fixed	Fixed	Fixed				No detection. No ped signals.
7100		Split (All Times)	29	23	38		90	Unknown	
Mistallatarras	I-91 Exit 7 SB	Movement	Middletown EB/WB	Ramp NB					
Middletown Ave	Off-Ramp	Туре	Fixed	Fixed					No detection. No ped signals.
7100	On Ramp	Split (All Times)	45	15			60	Unknown	
Middleter		Movement	Middletown EB/WB	Clinton NB/SB			_		
Middletown Ave	Clinton St	Туре	Fixed	Fixed					No detection. No ped signals.
7.00		Split (All Times)	45	15			60	Unknown	

TABLE 5B PAGE 1 OF 2

UPPER STATE ST AND MIDDLETOWN AVE PROPOSED TIMING

Mode	MAIN ST	CROSS ST	CATEGORY	Phase 1	Phase 2	Phase 3	Phase 4	CYCLE	OFFSET	COMMENTS
Name			Movement	State NB/SB	Ped	Humphrey WB	Humphrey EB/WB			Install left turn lanes at both State St approaches
Humphory St			Туре	Coordinated	Ped Button	Actuated	Actuated			
Weeksty PM Peak Spit	State St	Humphon/ Ct	Weekday AM Peak Split	36	18	24	12	90	42	detectors at Humphrey St approaches. New
Moderation Mod	State St	Trumpriery St	Weekday PM Peak Split	40	18	18	24	100	21	
Michael Mich			Daily Midday Split	32	18	16	14	80	58	
State Stat			All Other Times	22	18	14	16	70	24	reference to beginning of yellow Phase 1.
Medical Market Medi			Movement	State NB/SB	Ped	Edwards EB & State SB-R				
Marcian Salas Sa			Туре	Coordinated	Ped Button	Actuated				New loop detectors at Edwards St approaches.
Medicage Medicage	State St	Edwarda St	Weekday AM Peak Split	40	21	29		90	38	
Middletorn Mid	State St	Edwards St -	Weekday PM Peak Split	48	21	31		100	50	,
State St		Ī	Daily Midday Split	31	21	28		80	34	reference to beginning of yellow Phase 1.
Fact		Ī	All Other Times	26	21	23		70	1	
State St Meckday AM Peak Split 61 20 9 9 22 Coordinated operation. Unused time goes to next place of the state of the s			Movement	State EB/WB	Ped	East NB/SB				
State St Mechanic St Daily Midday Spit 47 20 13 10 10 54 10 10 10 10 10 10 10 1		Ī	Туре	Coordinated	Ped Button	Actuated				
Mechanic State Mechanic State Mechanic Split 59 20	Chata Ch	East St /	Weekday AM Peak Split	61	20	9		90	22	
Part	State St	Mechanic St	Weekday PM Peak Split	59	20	21		100	54	
All Other Times		Ī	Daily Midday Split	47	20	13		80	31	
State St 1-91 Exit 5 No Fig. 1-1 Exit 5 No Fi		Ī	All Other Times	31	20	19		70	64	
			Movement	State EB/WB	Ped	James NB / Driveway SB	Ramp EB			
Part		Ī	Туре	Coordinated	Ped Button	Actuated	Actuated			,
Off Ramp Weekday PM Peak Split 24 20 16 40 100 89 phase. Offset reference to beginning of yellow Phase 1. State St Daily Midday Split 23 20 11 26 80 64 All Other Times 17 20 14 19 70 28 Blatchley Ave Willow St Movement State EBWB Ped Blatchley NB / Willow EB 1 1 4 <td>04-4- 04</td> <td></td> <td>Weekday AM Peak Split</td> <td>28</td> <td>20</td> <td>10</td> <td>32</td> <td>90</td> <td>58</td> <td></td>	04-4- 04		Weekday AM Peak Split	28	20	10	32	90	58	
Daily Midday Spirit 23 20 11 26 80 64 64 64 64 64 64 64 6	State St		Weekday PM Peak Split	24	20	16	40	100	89	
State Stat		On Ramp	Daily Midday Split	23	20	11	26	80	64	, , , , ,
State Stat		Ī	All Other Times	17	20	14	19	70	28	
State St			Movement	State EB/WB	Ped	Blatchley NB / Willow EB				Pamaya all PTOP prohibitions New Joan
Blatchley Ave Welkday AM Peak Split 47 20 23 25 20 20 20 20 20 20 20		Ī	Туре	Coordinated	Ped Button	Actuated				
Weldow St Weekday PM Peak Split 51 20 29 100 82 Coordinated operation. Unused time goes to next phase 0. Phase 1.	0, , 0,	Blatchley Ave /	Weekday AM Peak Split	47	20	23		90	52	1
Movement State BB/WB State WB / Ferry NB Ped Movement State BB/WB State WB / Ferry NB Ped Movement Type Coordinated Fixed Actuated Ped Button Movement Move	State St	Willow St	Weekday PM Peak Split	51	20	29		100	82	Coordinated operation. Unused time goes to next
All Other Times 28 20 22 70 55		Ī	Daily Midday Split	35	20	25		80	61	
State St		Ī	All Other Times	28	20	22		70	55	Phase 1.
New Normal State			Movement	State EB/WB	State WB / Ferry NB-R	Ferry NB	Ped			
State St		Ī	Туре	Coordinated	Fixed	Actuated	Ped Button			
Middletown Ave Ferry St Weekday PM Peak Split 33 13 35 19 100 0 Unused time goes to next phase. Offset reference to beginning of yellow Phase 1.	04-4- 04	Ferry St / May	Weekday AM Peak Split	20	11	40	19	90	0	
Daily Midday Split 21 11 29 19 80 0 reference to beginning of yellow Phase 1.	State St	St	Weekday PM Peak Split	33	13	35	19	100	0	
Middletown Ave Ferry St Meekday PM Peak Split 19 24 19 70 0 Middletown WB/Ferry NB-R Ave Ferry NB/SB-R Ferry SB/Middletown WB-R Ferry SB/Middletown WB-		Ī	Daily Midday Split	21	11	29	19	80	0	,
Middletown Ave Type St Type St Weekday AM Peak Split 19 90 72 Weekday PM Peak Split 26 21 34 19 100 84 Daily Midday Split 19 15 27 19 80 76		Ī	All Other Times	18	9	24	19	70	0	g , , , , , , , , , , , , , , , , , , ,
Middletown Ave Ferry St Weekday AM Peak Split 19 14 38 19 90 72 Weekday PM Peak Split 26 21 34 19 100 84 Daily Midday Split 19 15 27 19 80 76			Movement	Middletown WB/Ferry NB-R	Ferry NB/SB-R	Ferry SB/Middletown WB-R				
Middletown Ave Ferry St Weekday AM Peak Split 19 14 38 19 90 72 Weekday PM Peak Split 26 21 34 19 100 84 Daily Midday Split 19 15 27 19 80 76		Ī	Туре							
Ave Ferry St Weekday PM Peak Split 26 21 34 19 100 84 Daily Midday Split 19 15 27 19 80 76	Middletown	F 0:		19	14	38	19	90	72	1
		Ferry St	· · · · · · · · · · · · · · · · · · ·	26	21		19	100	84	1
		<u> </u>	Daily Midday Split	19	15	27	19	80	76	1
Aii Other Tittles 10 13 22 19 70 58		<u> </u>	All Other Times	16	13	22	19	70	58	1

TABLE 5B PAGE 2 OF 2

UPPER STATE ST AND MIDDLETOWN AVE PROPOSED TIMING

MAIN ST	CROSS ST	CATEGORY	Phase 1	Phase 2	Phase 3	Phase 4	CYCLE	OFFSET	COMMENTS
		Movement	Middletown EB/WB	Ped	Ramp NB				
		Туре	Coordinated	Ped Button	Actuated				New loop detectors at ramp approach. New
Middletown	I-91 Exit 7 SB	Weekday AM Peak Split	50	20	20		90	44	pedestrian signals. Coordinated operation.
Ave	Off-Ramp	Weekday PM Peak Split	52	20	28		100	66	Unused time goes to next phase. Offset
		Daily Midday Split	40	20	20		80	40	reference to beginning of yellow Phase 1.
		All Other Times	30	20	20		70	28	
		Movement	Middletown EB/WB	Ped	Clinton NB/SB				
		Туре	Coordinated	Ped Button	Actuated				New loop detectors at Clinton St approaches.
Middletown	Clinton St	Weekday AM Peak Split	59	20	11		90		New pedestrian signals. Coordinated operation.
Ave	Cilitori St	Weekday PM Peak Split	63	20	17		100	9	Unused time goes to next phase. Offset
		Daily Midday Split	47	13	20		80	12	reference to beginning of yellow Phase 1.
		All Other Times	33	17	20		70	0	

TABLE 6A FORBES AVE EXISITNG TIMING

MAIN ST	CROSS ST	CATEGORY	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	CYCLE	OFFSET	COMMENTS
		Movement	EB	EB/WB	SB	NB/SB				
Water St	East St	Туре	Fixed	Fixed	Fixed	Fixed				Pre-timed operation.
		All Times	13	36.5	13	41.5		104	Unknown	
	Ctiles Ct /	Movement	EB/WB	EB/WB		NB/SB				Detection at minor movements. Coordinated
Forbes Ave	Stiles St / Wheeler St	Type	Actuated	Coordinated		Actuated				operation. Unused time goes to next phase. Actual
	Wildoldi Gt	Splits	Controlled by LCU	Controlled by LCU		Controlled by LCU		LCU	LCU	timings controlled by closed loop LCU.
		Movement		EB/WB		NB/SB				Detection at minor movement. Coordinated operation.
Forbes Ave	Fulton St	Type		Coordinated		Actuated				Unused time goes to next phase. Actual timings
		Splits		Controlled by LCU		Controlled by LCU		LCU	LCU	controlled by closed loop LCU.
		Movement		EB/WB	Ped	NB	NB/SB			
		Type		Coordinated	Ped Button	Actuated	Actuated			
Forbes Ave	Woodward	Pattern 1 0600-0900 Daily		27	19	12	22	80	47	Detection at minor movements. Coordinated operation. Unused ped time goes to coordinated
I Olbes Ave	Ave	Pattern 2 All other times		21	19	10	20	70	41	phase.
		Pattern 3 1500-1900 Daily		25	19	9	27	80	30	
		Pattern 4 1900-0600		14	19	7	20	60	23	
		Movement	WB	EB/WB	Ped	SB	NB/SB			
Forbes Ave	Townsend Ave	Type	Fixed	Fixed	Ped Button	Fixed	Fixed			Ped time added to cycle. No coordination.
		All Times	13	27	19	17	19	76 w/o ped; 95 w/ped	NA	

TABLE 6B FORBES AVE PROPOSED TIMING

MAIN ST	CROSS ST	CATEGORY	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	CYCLE	OFFSET	COMMENTS			
	East St -	Movement	EB	EB/WB	SB	NB/SB							
		Туре	Fixed	Fixed	Fixed	Fixed							
Water St		Weekday AM Peak Split	10	47	13	40		110	NA	Pre-timed operation.			
water of		Weekday PM Peak Split	10	28	16	41		95	NA	re-timed operation.			
		Weekday Midday Split	10	29	10	31		80	NA				
		All Other Times	11	29	11	29		80	NA				
	Stiles St / Wheeler St	Movement	EB/WB	EB/WB		NB/SB							
		Туре	Actuated	Coordinated		Actuated							
Forbes Ave		Weekday AM Peak Split	11	57		17		85	50	Detection at minor movements. Coordinated			
I OIDES AVE		Weekday PM Peak Split	13	48		19		80	57	operation. Unused time goes to next phase.			
		Weekday Midday Split	14	41		20		75	7				
		All Other Times	17	25		23		65	10				
	Fulton St	Movement		EB/WB		NB/SB							
		Туре		Coordinated		Actuated							
Forbes Ave		Weekday AM Peak Split		55		30		85	25	Detection at minor movement. Coordinated			
Foldes Ave		Weekday PM Peak Split		54		26		80	4	operation. Unused time goes to next phase.			
		Weekday Midday Split		43		32		75	37				
		All Other Times		33		32		65	48				
	Woodward Ave	Movement		EB/WB	Ped	NB	NB/SB						
		Туре		Coordinated	Ped Button	Actuated	Actuated						
Forbes Ave		Weekday AM Peak Split		43	19	10	13	85	64	Detection at minor movements. Coordinated			
I OIDES AVE		Weekday PM Peak Split		42	19	8	11	80	37	operation. Unused time goes to next phase.			
		Weekday Midday Split		36	19	9	11	75	0				
		All Other Times		24	19	10	12	65	13				
	Townsend Ave	Movement	WB	EB/WB	Ped	SB	NB/SB						
		Туре	Fixed	Fixed	Ped Button	Fixed	Fixed						
Forbes Avo		Weekday AM Peak Split	8	30	19	11	17	85	51	Detection at minor movements. Coordinated			
Foldes Ave		Weekday PM Peak Split	8	26	19	13	14	80	52	operation. Unused time goes to next phase.			
		Weekday Midday Split	8	22	19	10	16	75	72				
		All Other Times	8	22	19	8	8	65	8				

TABLE 7A FOXON BLVD EXISITNG TIMING

MAIN ST	CROSS ST	CATEGORY	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	CYCLE	OFFSET	COMMENTS
Middletown Ave	I-91 Exit 8 SB Ramps	Movement		EB/WB		SB						Detection at minor movements. Coordinated operation. Unused time goes to next phase.
		Type		Actuated		Coordinated						
		0630-0900 M-F		25		20				45	41	
		All Other Times		21		19				40	16	
Foxon Blvd	Middletown Ave / I-91 Exit 8 NB Off- Ramp	Movement	EB-L	EB/WB	SB	NB						Detection at minor movements. Coordinated operation. Unused time goes to next phase.
		Type	Actuated	Coordinated	Actuated	Actuated						
		0630-0900 M-F	10	46	7	22				85	22	
		All Other Times	20	28	7	25				80	58	
	New Haven Plaza	Movement	WB / NB-R	EB/WB		NB						Detection at minor movements. Coordinated operation. Unused time goes to next phase.
Foxon Blvd		Type	Actuated	Coordinated		Actuated						
1 OXOII BIVU		0630-0900 M-F	14	57		14				85	0	
		All Other Times	16	41		23				80	0	
Foxon Blvd	Quinnipiac Blvd	Movement	EB-L	WB	Ped	NB-L / SB-L	WB-L	EB	NB/SB			Detection at minor movements. Coordinated operation. Unused time goes to next phase.
		Type	Actuated	Coordinated	Ped Button	Actuated	Actuated	Coordinated	Actuated			
		0630-0900 M-F	11	29	14	11	11	29	20	85	55	
		All Other Times	16	28	14	9	16	28	23	90	20	

TABLE 7B FOXON BLVD PROPOSED TIMING

MAIN ST	CROSS ST	CATEGORY	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	CYCLE	OFFSET	COMMENTS
Middletown Ave	I-91 Exit 8 SB Ramps	Movement		EB/WB		SB						Detection at minor movements. Coordinated operation. Unused time goes to next phase.
		Type		Actuated		Coordinated						
		0630-0900 M-F		69		21				90	78	
		1500-1900 M-F		20		25				45	8	
		-1500 M-F; 1100-1700 S-S		42		38				80	16	
		All Other Times		36		34				70	12	
	Middletown Ave / I-91 Exit 8 NB Off- Ramp	Movement	EB-L	EB/WB	SB	NB						Detection at minor movements. Coordinated operation. Unused time goes to next phase.
		Type	Actuated	Coordinated	Actuated	Actuated						
Foxon Blvd		0630-0900 M-F	16	47	7	20				90	64	
FOXOII BIVU		1500-1900 M-F	26	30	8	26				90	5	
		-1500 M-F; 1100-170	19	33	8	20				80	56	
		All Other Times	16	23	10	21				70	2	
	New Haven Plaza	Movement	WB / NB-R	EB/WB		NB						Detection at minor movements. Coordinated operation. Unused time goes to next phase.
		Type	Actuated	Coordinated		Actuated						
Foxon Blvd		0630-0900 M-F	13	63		14				90	60	
1 OXOII BIVG		1500-1900 M-F	19	53		18				90	13	
		-1500 M-F; 1100-170	20	39		21				80	60	
		All Other Times	20	29		21				70	42	
	Quinnipiac Blvd	Movement	EB-L	WB	Ped	NB-L / SB-L	WB-L	EB	NB/SB			
Foxon Blvd		Type	Actuated	Coordinated	Ped Button	Actuated	Actuated	Coordinated	Actuated			Detection at minor movements. Coordinated operation. Unused time goes to next phase.
		0630-0900 M-F	11	37	14	9	9	39	19	90	0	
		1500-1900 M-F	11	37	14	12	11	37	16	90	42	
		-1500 M-F; 1100-170	9	31	14	9	9	31	17	80	6	
		All Other Times	9	23	14	9	9	23	15	70	68	<u> </u>

Figure 2 Ikea Area

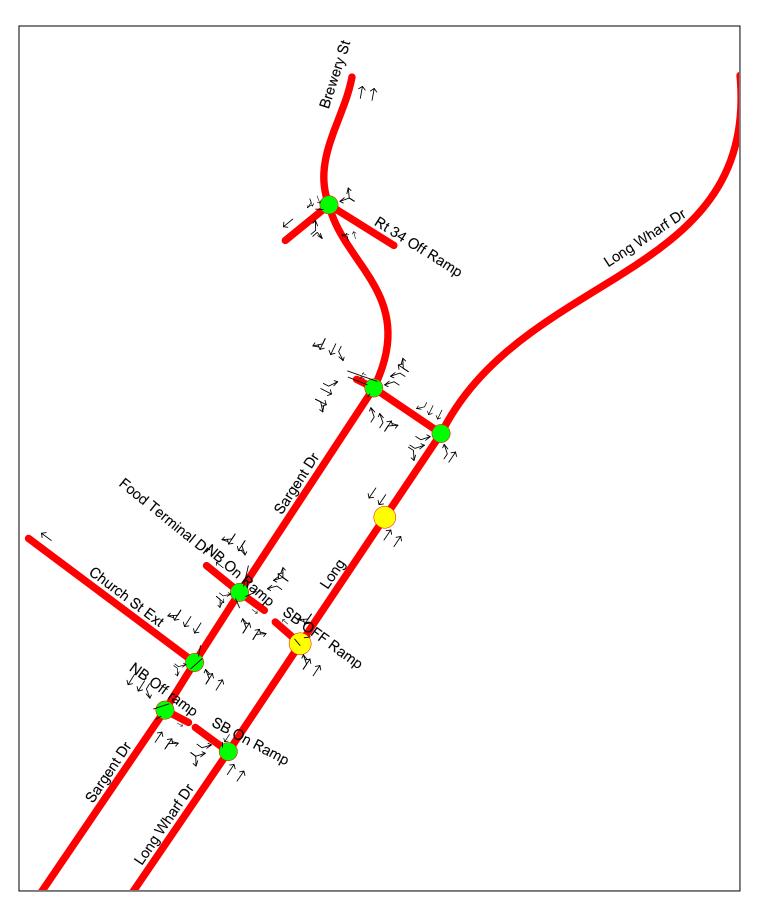


Figure 3 Grand Ave

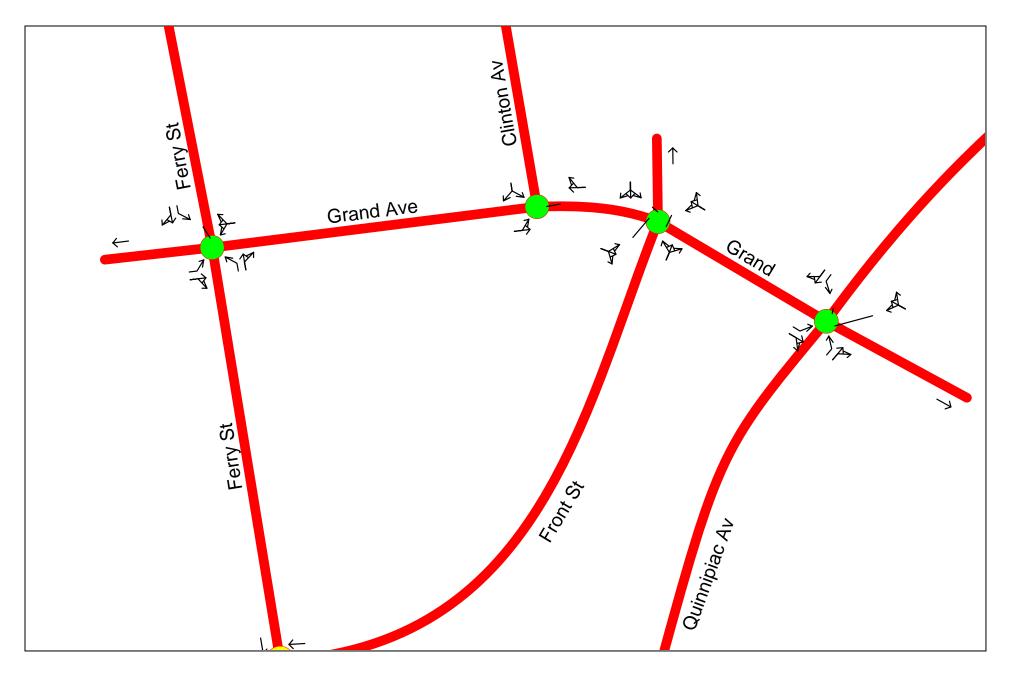


Figure 4



Clinton Av State St Blatchley Av ' Exit 5 NB Off Ramp Ferry St

Urbitran

Figure 6 Forbes Ave

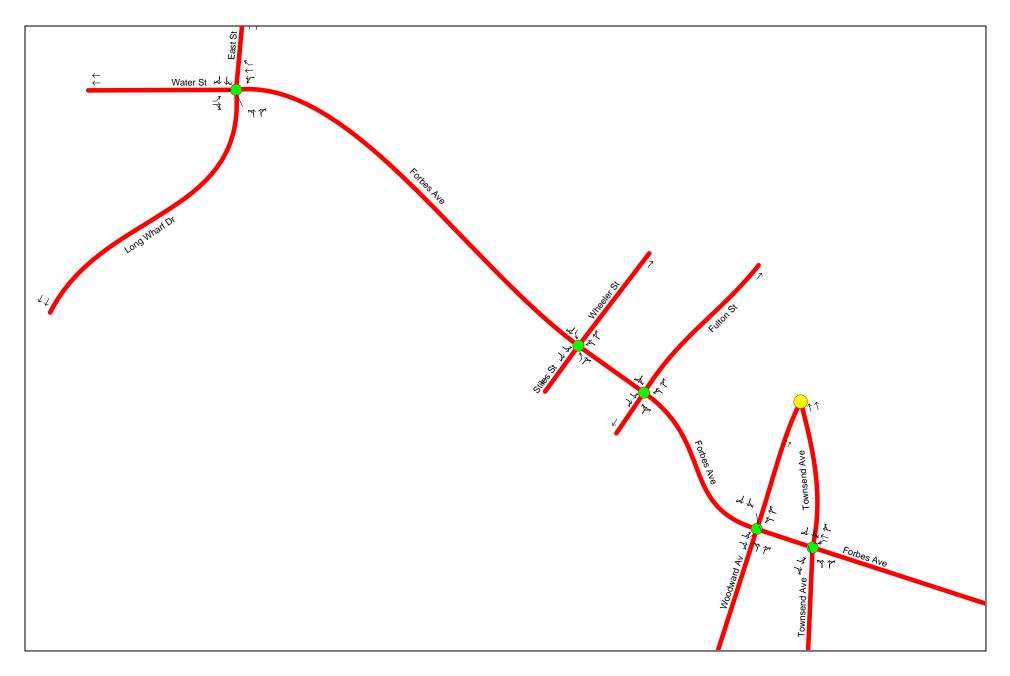
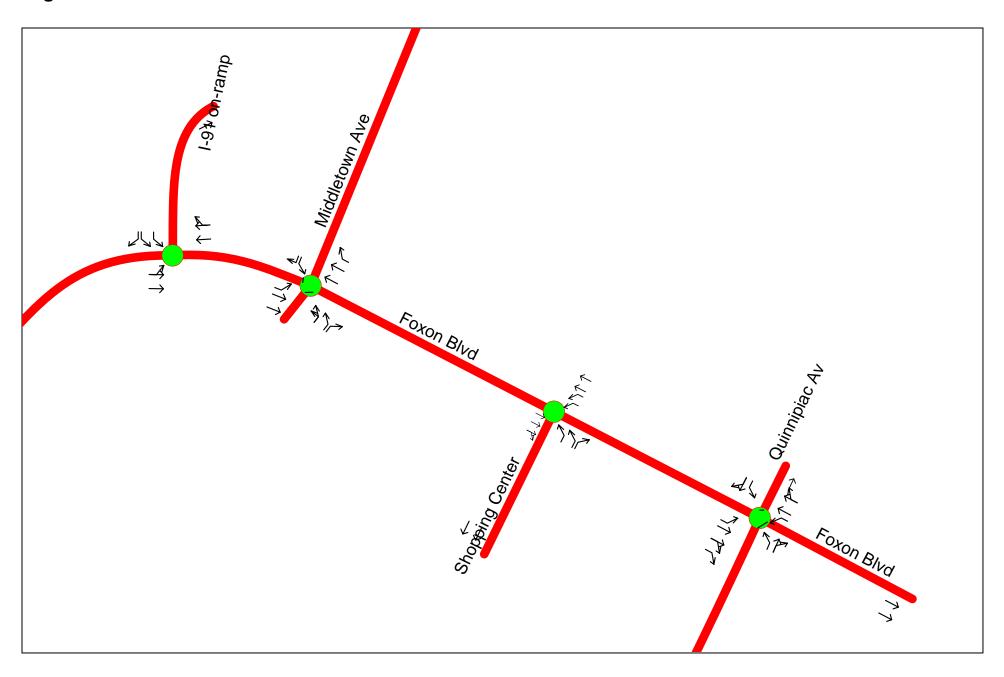


Figure 7





New York

71 West 23rd Street

New York, NY 10010

212.366.6200

29 Glen Cove Ave, Suite 202

Glen Cove, NY 11542

516.609.9195

New Jersey

570 Broad Street, 5th Floor

Newark, NJ 07102

973.643.0807

Connecticut

50 Union Avenue

Union Station, Third Floor East

New Haven, CT 06519

203.789.9977

Pennsylvania

538 Spruce Street, Suite 612

Scranton, PA 18503

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